

**REMARKS**

The present application was filed on July 10, 2003 with claims 1 through 21. Claims 2, 6, 10-13, 16 and 18 have been previously canceled without prejudice. Claims 10-13 had been withdrawn from consideration in response to a restriction requirement. Therefore, claims 1, 3-5, 7-9, 14, 15, 17 and 19-21 are presently pending in the above-identified patent application. Applicant herein proposes to amend claims 1, 14 and 21. Support for the amendments can be found, for example, page 11, line 5 through page 12, line 20, page 7, lines 25-26, page 8, lines 7-25, and FIG. 4. No new matter is being introduced.

In the Office Action, the Examiner rejected claims 1, 3-5, and 7-9 are rejected under 35 U.S.C. §101 because the claimed invention is allegedly directed to non-statutory subject matter, rejected claims 1, 3-5, 7-9, 14-15, 17 and 19-21 under 35 U.S.C. §112, second paragraph, as allegedly being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention, and rejected claims 1, 3-5, 7-9, 14-15, 17, and 19-21 under 35 U.S.C. §103(a) as allegedly being unpatentable over Eisenberg et al. (Nature, volume 299, 1982, pages 371-274) (hereinafter “Eisenberg”) in view of Silverman (PNA; April 24, 2001; volume 98, pages 4996-5001) (hereinafter “Silverman”).

The comments of the Examiner in forming the rejections are acknowledged and have been carefully considered.

Section 101 Rejection

In the Office Action, the Examiner rejected claims 1, 3-5, and 7-9 under 35 U.S.C. §101 as allegedly being directed to non-statutory subject matter. Specifically, on page 4, the Office Action stated that

- 5           the method claims are not so tied to another statutory class of invention because the method steps that are critical to the invention are “not tied to any particular apparatus or machine” and therefore do not meet the machine-or-transformation test as set forth in *In re Bilski* 545 F.3d 943, 88 USPQ2d 1385 (Federal Circuit, 2008).
- 10          Applicant proposes to amend claim 1 to include a tertiary protein structure analyzer embodied on a tangible computer-readable recordable storage medium executing on a computer configured to perform the denoted steps. Support for the amendments can be found, for example, page 11, line 5 - page 12, line 20 and FIG. 4.
- 15          As stated by the United States Court of Appeals for the Federal Circuit (*In re Bilski* (2008)), “A claimed process is surely patent-eligible under § 101 if: (1) it is tied to a particular machine or apparatus, or (2) it transforms a particular article into a different state or thing.” As such, Applicant respectfully asserts that, as amended, independent claim 1 recites a tie to a particular machine or apparatus, namely, a tertiary protein structure analyzer embodied on a tangible computer-readable recordable storage medium executing on a computer configured to perform the denoted steps.
- 20          Additionally, Applicant respectfully submits that the ties to the device that executes on a hardware processor, as well as the tie to an apparatus such as a computer, overcome the rejection and provide patentable subject matter. In *Ex parte Bo Li*, Appeal 2008-1213 (BPAI 2008), the BPAI stated that
- 25          the instant claim presents a number of software components, such as the claimed logic processing module, configuration file processing module, data organization module, and data display organization module, that are embodied upon a computer readable medium. This combination has been found statutory under the teachings of *In re Lowry*, 32 F.3d 1579 (Fed. Cir., 1994).
- 30          Therefore, Applicant respectfully asserts that independent claim 1, as amended, overcomes the §101 rejection. Also, Applicant further submits that by virtue of their dependence on allowable independent claim 1, claims 3-5 and 7-9, respectively, are

directed to statutory subject matter in their own right. Thus, Applicant respectfully requests reconsideration and withdrawal of the rejection of claims 1, 3-5, and 7-9 under 35 U.S.C. §101.

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Section 112, Second Paragraph, Rejection

Also, the Examiner rejected claims 1, 3-5, 7-9, 14-15, 17 and 19-21 under 35 U.S.C. §112, second paragraph, as allegedly being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. Beginning on page 5, the Office Action stated that

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[t]he term “same fractional distance” as newly amended claims 1, 14, and 21 is a relative term which renders the claim indefinite. The term “same fractional distance” is not defined by the claim, the specification does not provide a standard for ascertaining the requisite degree, and one of ordinary skill in the art would not be reasonably apprised of the scope of the invention. It is not known relative to what quantity each residue centroid has the same fractional distance.

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Applicant proposes amended independent claims 1, 14 and 21 to include “wherein each residue centroid having a same fractional distance to a surface of the tertiary protein structure as one or more additional residue centroids contributes an equivalent magnitude to the global linear hydrophobic moment as the one or more additional residue centroids by mapping each residue at a same distance from a center of the protein structure.” Support for the amendment can be found, for example, on page 8, lines 7-25.

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Applicant submits that, as amended, claims 1, 14 and 21, and the claims dependent therefrom, are definite and distinctly claim the subject matter which Applicant regards as the invention. Thus, Applicant respectfully requests reconsideration and withdrawal of the rejection of claims 1, 3-5, 7-9, 14-15, 17 and 19-21 under 35 U.S.C. §112, second paragraph.

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Section 103(a) Rejection

The Examiner also rejected claims 1, 3-5, 7-9, 14, 15, 17 and 19-21 under 35 U.S.C. §103(a) as allegedly being unpatentable over Eisenberg in view of Silverman. With regard to the §103 rejections, Applicant initially notes that a proper *prima facie* case of obviousness requires that the cited references when combined must “teach or suggest

all the claim limitations," and that there be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to combine the references or to modify the reference teachings. See MPEP §706.02(j). Therefore, as an initial matter, Applicant respectfully submits (as detailed 5 below) that the cited combination of references does not teach or suggest all of the limitations of the claims.

Applicant initially submits that the cited references do not teach or suggest the aspects of enhancing correlation between residue centroid magnitude and residue solvent accessibility, as well as using the first-order hydrophobic moment and the enhanced 10 correlation between residue centroid magnitude and residue solvent accessibility to define the global linear hydrophobic moment. As was previously established, for example, on page 8 of the Office Action dated August 5, 2008, the Examiner has conceded that

Eisenberg et al. does not show correlation enhancement between 15 residue centroid magnitude and solvent accessibility....

Consequently, Applicant respectfully asserts that because Eisenberg does not show using an enhanced correlation between residue centroid magnitude and solvent accessibility to define the global linear hydrophobic moment, an argument based in the teachings of Eisenberg to teach the same limitation is improper.

Additionally, page 9 of the Office Action further concedes that

Eisenberg et al. does not use residue centroids as the origins in the 20 hydrophobic moment calculations....

Applicant notes that this further emphasizes the point that Eisenberg does not 25 define a global linear hydrophobic moment as taught in independent claims 1, 14 and 21 because those claims (unlike Eisenberg) explicitly use "the centroid of residue centroids as a spatial origin of a global linear hydrophobic moment."

In addition, page 2 of the outstanding Advisory Action states that

[w]hile applicant argues that the Examiner has changed opinions 30 regarding Eisenberg et al. and this limitation, it is noted that this position (i.e. Eisenberg et al. does not teach this correlation) is explained in the NON-FINAL Office action of 27 October 2008. Applicant contends, however, that Eisenberg et al. does not teach this limitation. In making arguments, applicant has taken Eisenberg et al. out of context. 35 Specifically, the complete passage that applicant takes from Eisenberg et

5 al. [] states, "The abscissa value of Fig. 2 reflects the solubility of each helix in a non-polar medium, the points falling to the right representing helices which prefer a non-polar medium to a polar medium. The ordinate reflects the tendency of a helix to assume a preferred orientation at an interface between polar and non-polar media." Consequently, as the ordinate access is correlated with the abscissa in Figure 2 of Eisenberg et al., and the abscissa pertains to solvent accessibility, the ordinate access is correlated with solvent accessibility. (Emphasis added)

10 Applicant initially notes that on page 5 of the cited Non-Final Office Action of 27 October 2008, the Examiner explicitly states that "Eisenberg et al. does not show correlation enhancement between residue centroid magnitude and solvent accessibility...."

15 Also, with respect to the assertion that "the abscissa [of Fig. 2 of Eisenberg et al.] pertains to solvent accessibility" noted above, Applicant notes that the caption to Fig. 2 on page 374 of the Eisenberg reference states that "The abscissa gives the mean hydrophobicity of each segment...." Applicant respectfully contends that this is distinct from the interpretation provided by the Examiner above. By way of illustration, Applicant points to page 14, lines 12-13 of the specification, wherein it states that 20 "hydrophobicity values provide a relative measure of the overall hydrophilicity of the different proteins," and page 9, lines 15-16, wherein it states "residue solvent accessibility, i.e., the solvent-accessible surface area of each residue...." As such, Applicant respectfully submits that Fig. 2 of the Eisenberg reference does not show or suggest the claimed aspect of enhancing correlation between residue centroid magnitude 25 and solvent accessibility to define the global linear hydrophobic moment.

30 Also, Applicant assert that the cited references do not teach or suggest the claimed aspect of wherein each residue centroid having a same fractional distance to a surface of the tertiary protein structure as one or more additional residue centroids contributes an equivalent magnitude to the global linear hydrophobic moment as the one or more additional residue centroids by mapping each residue at a same distance from a center of the protein structure, as included in amended claims 1, 14 and 21.

Page 8 of the Office Action stated that

[s]ince all of the centroid magnitudes in Figure 1 have a different fractional distance the newly amended mapping step does not apply.

Also, page 12 of the Office Action stated that

5 [a]s no one of the residue centroids of Eisenberg has the same exact fractional distance as a second residue centroid, this limitation is met in Eisenberg et al. i.e. because no two residues have the exact same fractional distance, there is no mapping to be carried out.

10 Applicant respectfully submits that Eisenberg does not teach using or measuring fractional distance, from a residue centroid (which, as has been established, Eisenberg does not use for hydrophobic moment calculations, of which this is another) or otherwise. As such, Applicant asserts that the noted aspect of claims 1, 14 and 21 are applicable and correspondingly not taught by the references.

15 Also, page two of the outstanding Advisory Action states that

20 Applicant additionally argues that Eisenberg et al. does not teach the limitation “wherein each residue centroid having a same fractional distance to a surface of the tertiary protein structure as one or more additional residue centroids contributed an equivalent magnitude to the global linear hydrophobic moment.” This argument is not persuasive because there is no active step of calculation a fractional distance; the only requirement is that residue centroids HAVING the same fractional distance contribute an equivalent magnitude to the hydrophobic moment.

25 Applicant respectfully submit that the amendment to claims 1, 14 and 21 to include the limitation of “wherein each of the residue centroids contributes a magnitude and direction to the global linear hydrophobic moment, wherein a fractional distance of each residue centroid to a surface of the tertiary protein structure is measured, and wherein each residue centroid having a same fractional distance to a surface of the 30 tertiary protein structure as one or more additional residue centroids contributes an equivalent magnitude to the global linear hydrophobic moment as the one or more additional residue centroids by mapping each residue at a same distance from a center of the protein structure” overcome this assertion. Support for the amendment can be found, for example, on page 7, lines 25-26 of the specification.

35 Further, with respect to independent claim 1 and claims dependent therefrom, Applicant submits that the cited references do not teach or suggest the aspect of a tertiary

protein structure analyzer embodied on a tangible computer-readable recordable storage medium executing on a hardware processor to perform the denoted steps.

As noted herein, Applicant respectfully asserts that independent claims 1, 14 and 21 overcome the rejection as allegedly unpatentable over the references cited in this 5 rejection. As a result, Applicant respectfully submits that the combination of references does not teach or suggest the limitations in question, and therefore, that the §103 rejection is improper. To establish *prima facie* obviousness of a claimed invention, all the claim limitations must be taught or suggested by the prior art. *In re Royka*, 490 F.2d 981, 180 USPQ 580 (CCPA 1974). Also, Applicant further submits that by virtue of their 10 dependence on independent claims 1 and 14, claims 3-5, 7-9 and 15, 17-20, respectively recite patentable subject matter in their own right. If an independent claim is nonobvious under 35 U.S.C. 103, then any claim depending therefrom is nonobvious. *In re Fine*, 837 F.2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988). Therefore, Applicant respectfully requests withdrawal of the §103(a) rejection from claims 1, 3-5, 7-9, 14, 15, 17 and 19-21.

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All of the pending claims, i.e., claims 1, 3-5, 7-9, 14, 15, 17 and 19-21, are in condition for allowance and such favorable action is earnestly solicited.

If any outstanding issues remain, or if the Examiner has any further suggestions for expediting allowance of this application, the Examiner is invited to contact the 20 undersigned at the telephone number indicated below.

The Examiner's attention to this matter is appreciated.

Respectfully submitted,

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Michael J. Cooper  
Attorney for Applicant(s)  
Reg. No. 57,749  
Ryan, Mason & Lewis, LLP  
1300 Post Road, Suite 205  
Fairfield, CT 06824  
(203) 255-6560

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